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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tsuyoshi Wakasa

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KANESAKA BERNER AND PARTNERS LLP
1700 DIAGONAL RD
SUITE 310
ALEXANDRIA, VA 22314-2848

EXAMINER

CUEVAS, PEDRO J

ART UNIT

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2839

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,328	Applicant(s) WAKASA ET AL.	
	Examiner PEDRO J. CUEVAS	Art Unit 2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-12 and 15-17 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :8/23/06, 6/25/07, 7/19/07, 11/23/07 and 7/13/09.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 8-10, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,420,692 to Kos et al.

Kos et al. clearly teaches the construction of a motion responsive wind turbine tower damping system including a pitch-angle control mechanism (36) for controlling a pitch angle of windmill blades (10) on the basis of a blade-pitch-angle command (8), comprising:

an accelerometer (1), attached to a nacelle, for detecting the acceleration due to vibrations of the nacelle; and

an active damping unit (4 + 7) for calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the acceleration detected with the accelerometer and for outputting a blade-pitch-angle command (8) to the pitch-angle control mechanism (36).

3. With regards to claim 2, Kos et al. disclose:

a pitch-angle control unit (100) for calculating a pitch angle of the windmill blades for controlling the output of the wind turbine generator to be a predetermined value on the basis of wind speed (76), the rotational speed of a windmill rotor (48), or the

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output of the wind turbine generator (56) and for outputting a blade-pitch-angle command for output control (98); and

an adder (9) for supplying the pitch-angle control mechanism with a blade-pitch-angle command (89a) obtained by combining the blade-pitch-angle command for damping output from the active damping unit with the blade-pitch-angle command for output control output from the pitch-angle control unit.

4. With regards to claim 8, Kos et al. disclose a limiter (104) for limiting the pitch angle of the windmill blades or the angular speed of the pitch angle of the windmill blades to a predetermined range.

5. With regards to claim 9, Kos et al. disclose an active damping method of a wind turbine generator as disclosed above, the active damping method comprising:

an active damping step of calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the acceleration detected with the accelerometer and outputting a blade-pitch-angle command to the pitch-angle control mechanism.

6. With regards to claim 10, Kos et al. disclose an active damping method of a wind turbine generator as disclosed above, the active damping method comprising:

an active damping step of calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the acceleration detected with the accelerometer and outputting a blade-pitch-angle command for damping;

a pitch-angle control step of calculating a pitch angle of the windmill blades for controlling the output of the wind turbine generator to be a predetermined value on the basis of wind speed, the rotational speed of a windmill rotor, or the output of the wind turbine generator and outputting a blade- pitch-angle command for output control; and

an addition step of supplying the pitch-angle control mechanism with a blade-pitch-angle command obtained by combining the blade-pitch-angle command for damping in the active damping step with the blade-pitch-angle command for output control in the pitch-angle control step.

7. With regards to claim 16, Kos et al. disclose the active damping step includes a limiting step of limiting the pitch angle of the windmill blades or the angular speed of the pitch angle of the windmill blades to a predetermined range.

8. With regards to claim 17, Kos et al. disclose a windmill tower (12) comprising:

a wind turbine generator (20-32) including a pitch-angle control mechanism (100) for controlling a pitch angle of windmill blades on the basis of a blade-pitch-angle command;

an accelerometer (1), attached to a nacelle, for detecting the acceleration due to vibrations of the nacelle; and

an active damping unit (4 + 7) for calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the acceleration detected with the accelerometer and for outputting a blade-pitch-angle command to the pitch-angle control mechanism.

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Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 3, 4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,420,692 to Kos et al. in view of U.S. Patent No. 6,382,018 B2 to Knestel.

Kos et al. disclose the construction of a motion responsive wind turbine tower damping system as disclosed above.

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However, it fails to disclose:

a speed estimation unit for estimating a speed from the acceleration detected with the accelerometer; and

inputting the speed output from said speed estimation unit to the control unit for calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the speed output from said speed estimation unit.

Knestel disclose the construction of a measuring device, comprising acceleration sensors (22 and 23) and a central processing unit (CPU) or control unit (15) for the purpose of measuring longitudinal and transverse acceleration or deceleration and to calculate speed by integrating said acceleration or deceleration signal (Claim 11).

It would have been obvious to one skilled in the art at the time the invention was made to use the measuring device disclosed by Knestel on the motion responsive wind turbine tower damping system disclosed by Kos et al. for the purpose of calculating speed by integrating an acceleration or deceleration signal and providing said calculated speed as an input to the control unit disclosed by Kos et al.

13. With regards to claim 11, Kos et al. in view of Knestel disclose the active damping step including a speed estimation step of estimating a speed from the acceleration detected with the accelerometer, and a control step of calculating a pitch angle of the windmill blades for generating a thrust on the windmill blades so as to cancel out the vibrations of the nacelle on the basis of the speed estimated in the speed estimation step.

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14. With regards to claim 12, Kos et al. in view of Knestel disclose the speed estimation step integrating the acceleration detected with the accelerometer to calculate the speed.

15. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,420,692 to Kos et al. in view of U.S. Patent No. 6,382,018 B2 to Knestel as applied to claims 3, 4, 11 and 12 above, and further in view of U.S. Patent No. 4,160,170 to Harner et al.

Kos et al. in view of Knestel disclose the construction of a motion responsive wind turbine tower damping system as disclosed above.

However, it fails to disclose the control unit including any one of a proportional controller, a proportional-integral controller, a proportional-integral-derivative controller, a linear-quadratic regulator, and a linear-quadratic Gaussian regulator to which the speed estimated by the speed estimation unit is input to calculate the pitch angle.

Harner et al. disclose the construction of a wind turbine generator pitch control system, comprising control means including proportional, integral and derivative multipliers (Claim 36) for the purpose of producing a control signal indicative of a plurality of parameters of the system.

It would have been obvious to one skilled in the art at the time the invention was made to use the control means disclosed by Harner et al. on the motion responsive wind turbine tower damping system disclosed by Kos et al. in view of Knestel for the purpose of producing a control signal indicative of a plurality of parameters of the system.

16. With regards to claim 15, Harner et al. disclose the control step including a compensation step of performing a proportional, a proportional-integral, or a proportional-integral-derivative

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control for the speed estimated by the speed estimation step and calculates the pitch angle on the basis of the speed obtained after the compensation.

Allowable Subject Matter

17. Claims 5, 6, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter.

The prior art of record, taken alone or in combination, does not teaches:

the construction of a wind turbine generator as described on and including all the disclosed limitations of dependent claim 5, comprising a control unit that:

includes a phase-lead compensator for advancing the phase of the speed output from the speed estimation unit by a predetermined amount; and

calculates the pitch angle on the basis of the speed obtained after the phase-lead compensation; and

the design of an active damping method as described on and including all the disclosed limitations of dependent claim 13, comprising a control step that includes:

a phase-lead compensation step of advancing the phase of the speed estimated by the speed estimation step by a predetermined amount and calculates the pitch angle on the basis of the speed obtained after the phase-lead compensation.

Dependent claims 6 and 14 are considered allowable by their respective dependence on objected dependent claims 5 and 13.

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Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PEDRO J. CUEVAS whose telephone number is (571)272-2021. The examiner can normally be reached on M-F from 9:00 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, T. C. Patel can be reached on (571) 272-2098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Pedro J. Cuevas/
Examiner, Art Unit 2839
August 4, 2009

/Nicholas Ponomarenko/
Primary Examiner, Art Unit 2839
July 31, 2009